

What Is Claimed Is:

Patent Claims

- Add A3
1. A rain sensor, for motor vehicles in particular, comprising one measuring distance having at least one transmitter and at least one receiver for electromagnetic waves (light waves), a windshield being arranged in the measuring distance, and the measuring distance influencing the wave propagation between the at least one transmitter and the at least one receiver in such a way that when a coating forms on the windshield, in particular as the result of wetting by precipitation, an output signal sensed by the receiver is changed, characterized in that the optical and electronic components of the rain sensor (4) are mounted in a housing (6), a light conducting element (10) forming a cover of the housing (6).
 2. The rain sensor according to Claim 1, characterized in that the light conducting element (10) forms a base plate of the sensor housing (6) which has a broad area of connection with the windshield (2).
 3. The rain sensor according to Claim 2, characterized in that all optical and electronic components of the rain sensor (4) are mounted on a common printed circuit board (8) using SMD technology.
 4. The rain sensor according to Claim 3, characterized in that the rain sensor (4) is mounted in a rectangular-shaped sensor housing (6) having an integrated connector (38) for the electrical connection to a downstream analysis unit.
 5. The rain sensor according to Claim 4, characterized in that the printed circuit board (8) is connected to the connector (38) on the sensor housing (6) via contact pins.
 6. The rain sensor according to Claim 7, characterized in that the rain sensor (4) is cemented to the inside of the windshield (2).
 7. The rain sensor according to Claim 6, characterized in that a transparent film (36) which is self-adhesive on both sides is provided

as a connection between the windshield (2) and the light conducting element (10) of the rain sensor (4).

8. The rain sensor according to one of the preceding claims, characterized in that an output signal of the rain sensor (4) to a downstream analysis circuit contains information concerning an instantaneous degree of wetting of the windshield (2).

9. The rain sensor according to Claim 8, characterized in that a windshield wiper mechanism and/or a vehicle lighting system can be activated as a function of the output signals of the rain sensor (4).

10. The rain sensor according to one of the preceding claims, characterized in that the at least one transmitter is an LED (15).

11. The rain sensor according to Claim 10, characterized in that the first receiver which detects the optical signal emitted by the at least one LED (15) is a photodiode.

12. The rain sensor according to one of the preceding claims, characterized in that at least one ambient light sensor (22) is provided as a second receiver.

13. The rain sensor according to Claim 12, characterized in that the ambient light sensor (22) has an aperture angle of approximately 40° inclined upward with an aperture direction in the direction of travel.

14. The rain sensor according to one of Claims 12 or 13, characterized in that the at least one ambient light sensor (22) is sensitive to ultraviolet light, sunlight in particular.

15. The rain sensor according to one of the preceding claims, characterized in that if IR (infrared) light is used, the light conducting element (10) for the rain sensor function is made of black plastic.

16. The rain sensor according to one of the preceding claims, characterized in that optical

areas in the light conducting element (10) are provided from transparent (clear) plastic for the at least one receiver (20).

17. The rain sensor according to one of the preceding claims, characterized in that the light conducting element (10) includes a plastic part made using two-color injection molding.

18. The rain sensor according to one of the preceding claims, characterized in that the light conducting element (10) can be produced by combining two single-color plastics.

19. The rain sensor according to one of the preceding claims, characterized in that the light conducting element (10) is provided with integrated lens structures for light bundling.